HYDRO-ELECTRIC INQUIRY COMMISSION

GENERAL REPORT

MUSKOKA SYSTEM

JOSEPH H. W. BOWER
SECRETARY

General Map Showing Location of

Generating Stations, Transformer Stations and Transmission Lines

of the

Hydro-Electric Power Commission of Ontario.

MUSKOKA SYSTEM

The area outlined in red shows the

Muskoka System

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Generating Stations, Transformer Stations and Transmission Lines

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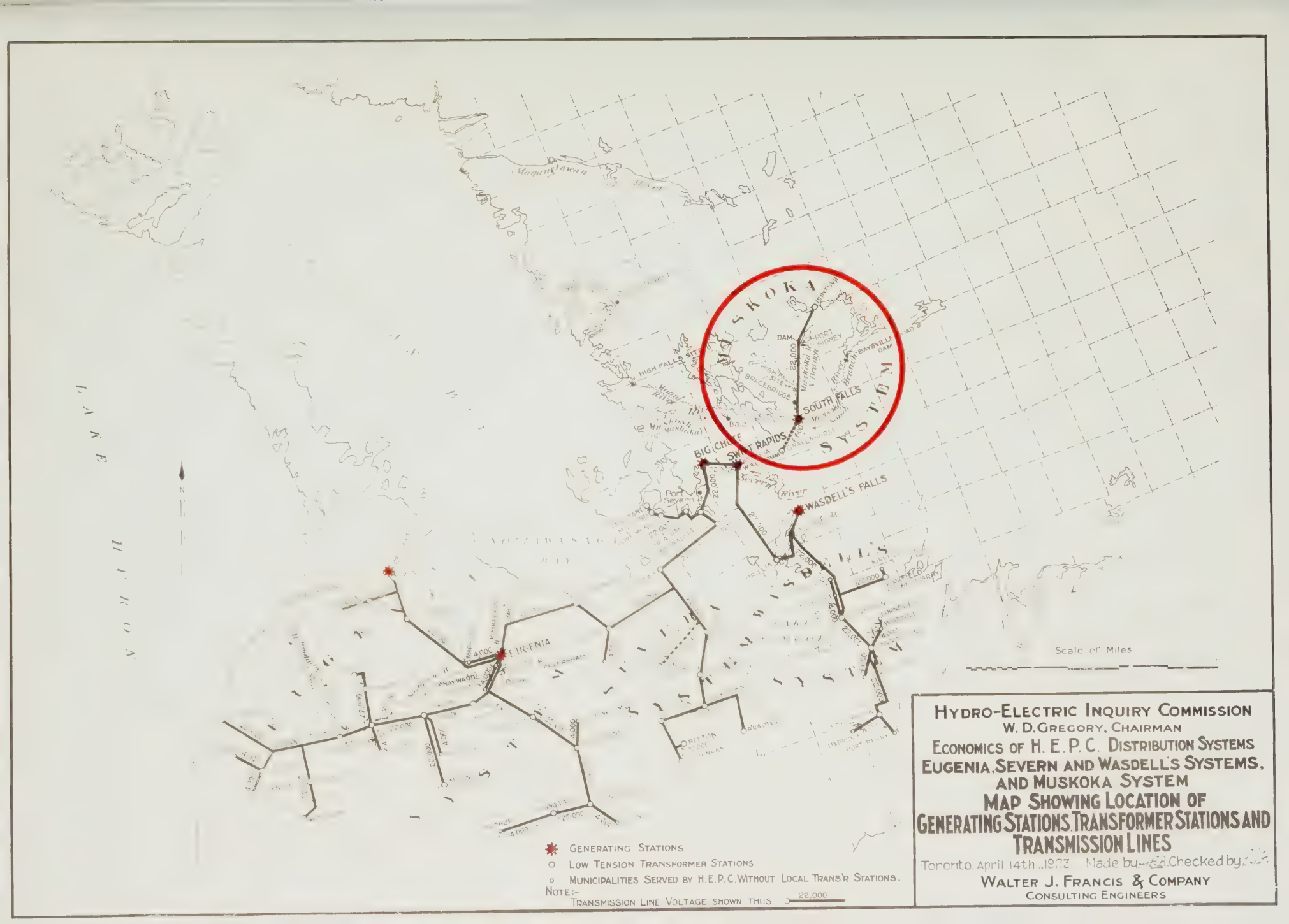
MUSKOKA SYSTEM
DAM
PORT SIDNEY
BAYSVILLE DAM
HIGH FALLS SITE
BRACEBRIDGE
SOUTH FALLS
BIG CHUTE
SWIFT RAPIDS
WASDELL'S FALLS
Port Severn
EUGENIA
MAY WARK
BELTON
GRADY
LAKE HURON
Scale of Miles
GENERATING STATIONS
LOW TENSION TRANSFORMER STATIONS
MUNICIPALITIES SERVED BY H.E.P.C. WITHOUT LOCAL TRANS'R STATIONS.
NOTE:- TRANSMISSION LINE VOLTAGE SHOWN THUS 22,000
HYDRO-ELECTRIC INQUIRY COMMISSION
W. D. GREGORY, CHAIRMAN
ECONOMICS OF H. E. P. C. DISTRIBUTION SYSTEMS
EUGENIA, SEVERN AND WASDELL'S SYSTEMS, AND MUSKOKA SYSTEM
MAP SHOWING LOCATION OF GENERATING STATIONS TRANSFORMER STATIONS AND TRANSMISSION LINES
Toronto, April 14th, 1923 Made by Checked by
WALTER J. FRANCIS & COMPANY
CONSULTING ENGINEERS

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on the

MUSKOKA SYSTEM

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on the

[illegible] SYSTEM

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COPY

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Toronto, Ontario,
August 20th, 1923.

Hydro-Electric Inquiry Commission,
W. D. Gregory, Esq., Chairman,
Toronto, Ontario.

re: General Report - Muskoka System

Mr. Chairman and Gentlemen:-

In accordance with your instructions, a general report on the Muskoka System has been made, along the lines approved of by the Commission on January 2nd. The work has been done under my direct personal supervision as per your instructions.

The reports of Messrs. Price, Waterhouse & Company and Messrs. Clarkson, Gordon & Dilworth, together with the report on this system by the Commission's Consulting Engineer, Mr. Walter J. Francis, have been used in the preparation of this report. No public hearing was held in connection with this system.

The report falls naturally into two parts. The first part includes sections entitled "Historical Sketch", "Physical", "General Economics" and "General Relations". These sections are largely a recital of facts. The second part of the report entitled "Summary" is merely intended to direct attention to those points which appear to require special consideration by the Commission.

Particular attention is directed to a sub-section of the report entitled "Addenda", which deals with the revision recently made in the reserve for renewals account.

All figures used in this report have been carefully checked by a representative of Messrs. Price, Waterhouse & Company. Reports forming the basis of this report are appended hereto, and in order to facilitate reference to the documents in question, on the right-hand margin of the report throughout will be found abbreviated references.

Yours very truly,

J.W. Dawson

Secretary

JWD/C

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M U S K O K A S Y S T E M

Historical Sketch

During the year 1909 the Hydro-Electric Power Commission of Ontario first investigated power conditions in the district now comprising the Muskoka System, with a view to supplying electrical energy to the Town of Huntsville. The results of this investigation are contained in a report to the Municipality of Huntsville under date of September 15th, 1909. A further report on the power possibilities in this district was made by the Commission on September 1st, 1911. In this, special reference was made to the possible development of the power site at High Falls on the North Branch of the Muskoka River. WJF. p.4.

Following the submission of a by-law to the ratepayers of Huntsville which was passed on January 4th, 1915, and ratified by the Legislature on April 8th, 1915, a contract was made between the Commission and the Town of Huntsville on March 10th, 1915. P.W. Report March 29/23. WJF. p.4.

A by-law was submitted to the ratepayers of Gravenhurst which was passed on October 2nd, 1915, and ratified by the Legislature on April 27th, 1916, and on October 25th, 1915, a contract was made between the Commission and the Town of Gravenhurst. P.W. Report March 29/23. WJF. p.4.

[illegible]

Electrical Models

In October, 1915, the hydro-electric power development at South Falls on the South Branch of the Muskoka River was taken over by the Commission from the municipality of Gravenhurst. The municipality retained the transmission lines from the generating station to the town, together with the distributing station and system in Gravenhurst. The purchase of the properties at South Falls was authorized by an Order-in-Council dated November 10th, 1915. WJF. p.4.

The engineers of the Commission, in a report dated June 28th, 1915, gave the results of a valuation of all of the properties included in the Gravenhurst Power System. The following excerpt shows these properties divided into four main groups for which the replacement value and the present value had been estimated. The first of these items only, namely, the generating plant, was purchased by the Commission.

Items	Replacement Cost as at June 28th, 1915	Present Value
Generation	$52,158	$39,386
Transmission	10,120	4,048
Transformation	13,050	10,362
Distribution	15,366	8,734
Totals	$90,694	$62,530

WJF. p.5.

In October, 1915, the hydro-electric power development at Death Falls on the South Branch of the Dasheke River was taken over by the Commission from the municipality of [illegible]. The municipality retained the transmission lines from the generating station to the town, together with the distributing station and system in [illegible]. The purchase of the properties at Death Falls was authorized by an Order-in-Council dated [illegible] 10th, 1915.

The engineers of the Commission, in a report dated June [illegible], gave the results of a valuation of all of the properties included in the Government power system. The following extract shows these properties divided into four main groups for which the replacement value and the present value has been estimated. The first of these items only, namely, the generating plant, was purchased by the Commission.

Items	Replacement Cost as at June 30th, 1916	Present Value
Generation	[illegible]	[illegible]
Transmission	[illegible]	[illegible]
Transformation	[illegible]	[illegible]
Distribution	[illegible]	[illegible]
Total	[illegible]	[illegible]

In this report it was suggested that the sum of $43,388.61 be paid to the municipality of Gravenhurst for the purchase of the generating plant which, it was estimated, had a value at that time of $39,386, and would cost $52,158 to replace. The actual price paid, however, was $50,596. A revaluation of the properties was again made, following the purchase of the development, and an amount of $33,230.00 was put down as tangible values, the difference of $17,366.00 being entered in the books of the Commission as intangibles. WJF. p.5 & 6.

The Muskoka System commenced operations on November 1st, 1915, by operating the purchased generating station at South Falls. This had at that time an installed capacity of about 480 horse-power, about 250 of which was supplied to the municipality of Gravenhurst over its transmission line, 8.8 miles in length, at the generator voltage of 6,600 volts. WJF. p.6.

Plans were immediately put under way to increase the capacity of the plant to meet the demands on the system, and to provide for the future requirements. WJF. p.6.

On August 25th, 1916, the new equipment was put into service, making available an additional 800 electrical horse-power. WJF. p.6.

The transmission line from Huntsville to South Falls, a distance of about 26 miles, was completed and tested on August 15th, 1916, and on August 25th Huntsville

received its supply of power from the Muskoka System at 22,000 volts. WJF. p.6.

The demand from Gravenhurst and Huntsville for power continued to increase steadily until in the year 1920 the full capacity of the South Falls generating station was reached. A further investigation of the undeveloped power possibilities and ultimate capacity of the South Falls site was made in that year. Towards the end of 1920, however, the demand for power from the municipality of Huntsville decreased, due to industrial difficulties of the Anglo-Canadian Leather Company, the largest individual consumer of electricity on the Muskoka System. The average load on the system decreased about 150 electrical horse-power in 1921, but an improvement is shown for 1922, with an average of 12 monthly, twenty-minute peaks of 1,340 electrical horse-power and a maximum yearly peak of 1,456 electrical horse-power. WJF. p.7.

received its supply of power from the Keokuk System at 22,000 volts.

The demand from [illegible] and [illegible] for power continued to increase steadily until in the year 1922 the full capacity at the [illegible] Falls generating station was reached. A further investigation of the undeveloped power possibilities and ultimate capacity of the [illegible] Falls site was made in that year. Towards the end of 1922, however, the demand for power from the municipality of [illegible] decreased, due to industrial difficulties of the Anglo-Canadian Leather Company, the largest individual consumer of electricity on the [illegible] System. The average load on the system decreased about 18% electrical horse-power in 1921, but an improvement is shown for 1923, with an average of 12 monthly, twenty-minute peaks of 1,[illegible] electrical horse-power and a maximum yearly peak of 2,[illegible] electrical horse-power.

P H Y S I C A L

General

The Muskoka System lies north of the Severn and Wasdell's Systems. It extends about thirty miles north and south, and includes within its boundaries part of the county of Muskoka. Parts of the counties of Parry Sound and Haliburton might be served from this system if necessary. WJF. p.6.

Speaking broadly, the Muskoka System consists of a 1,280 horse-power hydro-electric generating plant on the South Branch of the Muskoka River at South Falls, together with transmission lines and distributing stations feeding two municipalities. WJF. p.8. & 10.

Generating Station and Other Sources of Power Supply

The South Falls plant is the only generating station on the Muskoka System at present owned by the Commission.

This development is located on the South Branch of the Muskoka River, at Muskoka Village, three miles to the south of Bracebridge and about seven miles north of Gravenhurst. The first stage of the development was completed in 1906, and consisted of a concrete dam twenty feet high by eighty feet long, from which the water was led to a power house through a steel penstock three feet

in diameter and about 1,000 feet long. The generating equipment contained in the power house was one 700 horse-power turbine utilizing a head of about 105 feet, directly connected to a 450-K.V.A., three-phase, 60-cycle, 6,600-volt generator, manufactured by the Allis-Chalmers Bullock Company, supplying electricity to Gravenhurst at the same voltage. WJF. p.10

During September of 1915 plans were commenced to increase the capacity of this plant and to provide for the future extension of the development. This work consisted of remodelling the forebay, installing a wood-stave pipe line and a short length of steel penstock, the extension of the power house and the tail-race, and the addition of the mechanical and electrical equipment required. WJF. p.10

Because of the nature of the work and because the old plant had to be kept in service during the extensions, the engineers state that only the superstructure could reasonably be let by contract, and that it was impossible to obtain economical tenders for the other work. The construction was therefore undertaken by the Commission under force account, except for the power house superstructure, which was let to Messrs. Witchall & Sons, Toronto. WJF. p.10All.

It was also found necessary to raise the level of a stretch of highway upstream from the dam in order that the water might be raised to its maximum economical head. WJF. p.11.

The changes and additions to the substructure were completed on March 27th, 1916, and Messrs. Mitchell & Sons of Toronto on May 27th, 1916, completed their contract for the superstructure work, which included the construction of a concrete floor and roof in the old section of the power house. The Pacific Coast Pipe Company installed a wood-stave pipe line five feet in diameter and 970 feet long, connecting it to a 30-foot length of steel penstock, constructed and installed by the William Hamilton Company of Peterborough, which company was also the contractor for one 1,060 horse-power, horizontal, single-runner, Francis type turbine, operating at 720 revolutions per minute. This turbine has a globe casing and fly wheel and is equipped with a butterfly valve. One 750-K.V.A.,3-phase, 60-cycle, 6,600-volt generator and one 20-kilowatt motor-driven exciter, together with transformers and other electrical apparatus were supplied and installed by the Canadian General Electric Company. The units of this plant operate at a minimum head of 102 feet and a mean net head of 108 feet. The mean gross head at the site is about 115 feet. Three 400-K.V.A. station transformers step up the voltage from 6,600 to 22,000 volts for transmission to the distributing station at Huntsville. The power is transmitted to Gravenhurst at 6,600 volts, the generator voltage of the South Falls plant.

WJF.
p.11&12.

The drainage area of the South Branch of the Muskoka River above this site is about 677 square miles and the developed water storage of the river is about 1,050 million cubic feet. Local pondage at the plant is available for daily peak operation. WJM. P.12.

The installed capacity of this plant at the present time is approximately 1,280 electrical horse-power at 80% power factor in accordance with the ordinary rating of the Commission. It is stated, however, that a maximum of 6,000 horse-power can be developed at this site with the addition of the necessary generating equipment, for which it is understood some provision has already been made during the period of alterations in the years 1915 and 1916. WJF. p.12

Undeveloped Power Sites

The partly developed South Falls power site on the South Branch of the Muskoka River has available the largest undeveloped power possibilities in the district included in the Muskoka System. There are 1,280 electrical horse-power developed at the present time, and it is stated that about 4,000 horse-power more can be made available without the necessity of any additional structures or the further purchase of properties. Details of this site are given on page 13 of our Consulting Engineer's report. WJF. p.12 & 13.

At High Falls on the North Branch of the Muskoka River, about eight miles north of the South Falls plant, and about 21 miles from the town of Huntsville, there is an undeveloped hydro-electric power site stated to have a capacity of about 1,300 water horse-power obtainable at a head of 44 feet. A dam at this point would improve the low water conditions of the hydro-electric plants owned by the municipality of Bracebridge, and located farther downstream on the same river. It was stated by the Commission in a report dated September 1st, 1911, that a generating plant of 1,200 horse-power installed capacity could be built at High Falls for about $65,000, with transformer equipment at both High Falls and Huntsville to cost $19,600, and 21 miles of transmission lines about $51,600. The whole development was estimated to cost approximately $136,200, or equivalent to a capital cost of $114 per horse-power developed for 1911 conditions. The proximity of this site to the existing high voltage transmission line from the South Falls generating station to Huntsville would permit of the parallel operation of the South Falls plant and a plant at High Falls with the construction of only about one mile of additional transmission line. The elimination of this item, together with the cost of transformers at Huntsville, would be equivalent to about $70,000. This would leave only the plant and a mile or so of line to be built, and allowing for increased costs since

WJF. p.13 & 14.

We high Dri im on the North Branch of the

1911 the development might possibly prove economically feasible on further investigation. WJF. p.14.

On the Muskoka River, at the outlet of Lake Muskoka and about 10 miles from Georgian Bay, are located two falls known as Moon Chute, 10 feet head, and Bala Falls, 20 feet head. Reports to the Commission of Conservation of reconnaissance surveys made some years ago indicate that these two falls might be developed together to give about 2,500 water horse-power at a minimum of 30 feet head. A development at this site would probably control the level of the Muskoka Lakes making available a very large pondage above the dams, but it is doubtful whether this could be utilized as a commercial peak load plant due to the fact that fluctuations of the water level would be injurious to the use of these lakes as summer resorts, which purpose they serve extensively at the present time. WJF. p.14.

About five miles farther downstream on the same river, commences a series of four falls known respectively as First and Second Falls, 20 feet head; Third Fall, 12 feet head; Fourth Fall, 30 feet head; and Eighth Fall, 34 feet head. These four falls aggregate about 96 feet total head, and a development at this site would have the benefit of the Lake Muskoka storage. A plant of a few thousand horse-power might possibly be installed at this site if the local construction conditions prove feasible and economical, upon further investigation. WJF. p.14 & 15.

There are also two possible power sites on the Moon River which also drains Lake Muskoka a short distance north of the Muskoka River. These are as follows: A series of five rapids is located about 15 miles from the source of this river, and are known as Curtain Chutes, Seven Sisters Rapid, Knife Rapid, Annie Rooney Rapid and Island Portage, and have a total head of 58 feet, and a combined capacity of about 2,000 or 3,000 horse-power. About five miles downstream from this site, near the mouth of the Moon River where it empties into Georgian Bay, there are two falls within a short distance of each other, known as High Falls and Twin Falls. These have a combined head of 60 feet and it is stated that a development at this site would also have available about 2,000 or 3,000 horse-power. Very little information of value is available for these sites. WJF. p.15.

Miscellaneous Power Plants in the District

A table giving the location, size and ownership of the various plants in the district of the Muskoka System is given on page 16 of our Consulting Engineer's report.

It is stated that the hydro-electric plants owned by the municipality of Bracebridge are now being operated to full capacity and that a request for estimates on the cost of additional power has been made to the Commission. WJF. p.16

Transmission Lines

Up to October 31st, 1921, the Commission had constructed a total of 26.32 miles of high voltage transmission lines, supplying the municipality of Huntsville at 22,000 volts from the South Falls generating station.

The transmission line to Gravenhurst, 8.8 miles in length, delivers power to the town at 6,600 volts. This line was constructed by the municipality and is still owned by it. The transmission system is constructed on wooden poles throughout and presents no extraordinary features. WJF. p.16.

Transforming & Distributing Station

The transmission line feeds the municipality of Huntsville at low voltage through the substation located in that town. The capacity of the transformers is 900 K.V.A., stepping down the voltage from 22,000 to 2,300 volts, and to 575 volts.

The municipality of Gravenhurst does not require a high voltage transforming station as it receives power at 6,600 volts, the voltage of the generators at the South Falls plant, and has its own municipal substation reducing the voltage to 2,200 volts for distribution in the municipality. WJF. p.17

Transmission lines

In an October 31st, 1913, the Commission pro-

posed a route for a 33,000 volt three phase transmission line. Modified the specifications to increase the capacity at Electric Park. The capacity of the transformers in the Electric Park plant. The capacity of the transformers in the Electric Park plant was 37,000 kw at 4,600 volts, but the specified over the voltage given was 33,000 kw at 4,600 volts, but the specified over the voltage given was 33,000 kw at 4,600 volts, but the specified over the voltage given was 33

Local Distributing Systems

There are no municipalities on the Muskoka System in which the Commission distributes retail power to the consumers. The Commission acts as a wholesale distributor only and in both of the municipalities the electricity is distributed by the municipality itself. It is understood that the accounting for both of the municipalities of the system is done in accordance with the standard accounting system of the Commission, and the details for the various municipalities are given in the Annual Reports.

WJF.
p.17.

A map showing the location of the generating station and transmission lines in the system forms the frontispiece of this report.

GENERAL ECONOMICS

Capital Investment

In October 1915, the Commission purchased, from the town of Gravenhurst, a power development which consisted of certain lands, storage dams, power house, generating equipment, etc., situated at South Falls on the South Branch of the Muskoka River for $50,595.95. In satisfaction of the purchase consideration the Commission assumed the following outstanding debentures standing against the properties:

All outstanding debentures issued under Municipal By-Laws.-		
By-Law Number 381-397, due 1936	$38,532.26	
By-Law Number 480 due 1943	7,693.15	
One third of the liability in respect of outstanding debentures issued under By-Law number 409 due 1939	4,370.52	P.W. p.2.
Total -	$50,595.93	

The annual payments required in connection with interest and principal for the above debentures are:-

By-Law Number 381-397 principal and interest	$2,927.51	
By-Law Number 309 sinking fund and interest - $1,017.45 one-third of which is payable by the Commission	339.15	P.W. p.3.
By-Law Number 480 - sinking fund and interest	582.64	
Total -	$3,849.10	

The amounts included in the above as representing sinking fund payments are being met out of advances to the Commission by the Province while the interest is charged to

Financial Statement

Profit & Loss Account

for the year ended 31st December 1918

To Balance brought down		1,247,318
To Gross Profit for the year		2,893,456
		4,140,774
To Salaries	312,450	
To Rent, Rates & Taxes	87,200	
To Depreciation	145,000	
To Interest on Debentures	60,000	
To Net Profit for the year	1,536,124	
To Balance carried down	1,900,000	
		4,140,774

Balance Sheet

as at 31st December 1918

Capital Authorised and Issued		5,000,000
Debentures		1,200,000
Sundry Creditors		487,320
Bank Overdraft		312,680
		7,000,000
Freehold Property	3,500,000	
Plant & Machinery	1,850,000	
Stock-in-Trade	1,100,000	
Sundry Debtors	550,000	
		7,000,000

the municipalities as a part of the cost of power supplied to them.

The Engineers of the Commission, in a report dated June 26th, 1915, gave the results of a valuation of all of the properties included in the Gravenhurst Power System. The following excerpt shows these properties divided into four main groups for which the replacement value and the present value had been estimated. The first of these items only, namely, the generating plant, was purchased by the Commission.

Items	Replacement cost as at June 26th, 1915	Present Value	
Generation	$52,158	$39,386	
Transmission	10,130	4,048	WJP.
Transformation	13,050	10,362	p.5.
Distribution	15,356	8,734	
T o t a l s -	$90,694	$62,530	

In this report it was suggested that the sum of $43,388.61 be paid to the municipality of Gravenhurst for the purchase of the generating plant which, it was estimated, had a value at that time of $39,386, and would cost $52,158 to replace. The actual price paid, however, was $50,596. A re-valuation of the properties was again made, following the purchase of the development, and an amount of $33,230 was put down as tangible values, the difference of $17,366 being entered in the books of the Commission as intangibles. WJP. 5 & 6.

the municipalities as a part of the cost of power supplied to them.

The Engineers of the Commission, in a report dated June 25th, 1913, gave the results of a valuation of all of the properties included in the [illegible] system. The following excerpt shows these properties divided into four main groups for which the replacement value and the present value had been estimated. The first of these items only, namely, the generating plant, was purchased by the Commission.

Items	Replacement cost as at June 30th, 1913	Present Value
Generation	202,148	197,801
Transmission	14,140	6,040
Transformation	11,060	10,240
Distribution	14,396	6,724
T o t a l s -	240,694	220,805

In this report it was suggested that the sum of $202,148.11 be paid to the municipality of [illegible] for the purchase of the generating plant which, it was estimated, had a value at that time of $197,801, and would cost $22,148 to replace. The actual price paid, however, was $207,034. A revaluation of the properties was again made, following the purchase of the development, and an amount of $190,140 was put down as tangible values, the difference of $17,044 being entered in the books of the Commission as intangibles.

Since the acquisition of the above named property, the Commission has expended $161,935.03 in extending the plant, lines and other equipment of the system, which makes a total investment of $212,550.96 at October 31st, 1921. The principal items going to make up the expenditure of $161,935.03 are as follows:- P.W. p.6.

Power Development -		
South Falls Generating Station, etc.	$43,488.95	
Hydraulic Construction, etc.	54,235.79	$97,724.74
Wood Pole Lines -		
Transmission line from South Falls generating station to the Town of Huntsville	52,700.07	
Miscellaneous	1,613.37	54,313.44
Distributing Station at Huntsville -		
Building	1,500.55	
Electrical and other equipment	8,396.32	9,896.85
Total expended for extensions and improvements since October 1918		$161,935.03

The investment of $212,550.96 in this system at October 31st, 1921, may be classified as follows:

Power Development	$148,521	
Transmission Lines	54,313	
Transforming & Distributing Station	9,697	W.J.P. p.23.
	$212,531	

The following table shows the capital costs per rated horse-power developed for each of the years from 1916 to 1921:

WJF. p.29

	Fiscal years ending October 31st, 1916	1917	1918	1919	1920	1921
Power Development	$164.10	$99.50	$105.00	$108.80	$115.60	$116.00
Transmission Lines	109.50	42.40	42.40	42.40	42.40	42.40
Transforming & Distributing stations	18.60	6.96	7.52	7.53	7.65	7.74
T o t a l s	$292.20	$148.86	$154.92	$158.73	$165.65	$166.14

It will be noted from the above table that the capital costs per rated plant horse-power developed was high in 1916. This is due to the fact that the repairs and additions to the South Falls plant were made during this year, and the expenditures therefor were included, while no additional power had yet been made available.

In respect of the capital costs of the horse-power of the Muskoka System, our Consulting Engineer states:

> "The capital costs of the Muskoka System contain an item of about $17,400, representing the value of intangibles taken over with the South Falls plant. The capital cost of the South Falls generating station show reasonable construction costs and now stand at about $116.00 per horse-power." WJF. p.53.

Reserve for Renewals

The balance in the reserve for renewals at October 31st, 1921, amounted to $25,471.39.

During the period from the commencement of operations in 1915 to October 31st, 1920, the additions to the reserve for renewals, in respect of the properties of the Muskoka System, were provided through inclusion in the cost of power to the municipalities of an annual charge of 3½% on the capital invested in the works, lines, etc., together with interest at 4% per annum on the balance in the reserve account. P.W. p.10.

In the fiscal year ending October 31st, 1921, upon the advice of its engineers, the Commission reduced the annual rate of renewal from 3½% to 2½% on the capital investment, while the interest rate of 4% remained unchanged. The accounts of the Commission were so adjusted that the rate of 2½% was made effective from the inception of the system to October 31st, 1921, and the cost of power to the municipalities was correspondingly reduced.

A summary of the reserve account, with a balance of $25,471.39, as constituted at October 31st, 1921, upon the 2½% basis is as follows:

Particulars	Annual Accrual	Interest at 4%	Together
Fiscal year ending October 31st			
1917	$4,184.53		$4,184.53
1918	4,956.75	$167.37	5,124.10
1919	5,078.29	372.44	5,450.73
1920	5,308.65	590.59	5,899.22
1921	5,313.27	822.51	6,135.78
Together	$24,841.25	$1,952.91	$26,794.16

Deduct

Cost of renewals, replacements, etc.-			P.W. p.11.
Cost of rewinding 450 K.W. generator and repairs thereto and sundry charges		$1,160.12	
Portion of reserve applicable to property transferred from system		20.00	
		$1,180.12	
Interest applicable to above charges		142.65	1,322.77
Balance as at October 31st, 1921			$25,471.39

The annual rate of 2½% was determined by a re-classification of the properties made by the Engineering Department of the Commission and reflected in the book accounts as at October 31st, 1920. The actual rate arrived at was 2.42% and the rate of 2.5% of the capital investment was, therefore, adopted as a matter of convenience. In arriving at the above mentioned rate, clerical errors in the computation were made by the Engineering Department so that on the basis used the rate should have been 1.694%

Participants	Amount	Interest	Total
Fiscal Year Ending October 31st			
1914	$2,194.32		$2,194.32
1915	4,388.64	$114.24	4,502.88
1916	6,582.96	228.48	6,811.44
1917	8,777.28	342.72	9,120.00
1918	10,971.60	456.96	11,428.56
Total	$33,914.80	$1,142.40	$35,057.20

Footnote

Date of remarks, explanatory.

Date of meeting and B.M. Jan.

Annual meeting

Monthly meeting

Portion of Chapter Obligation as

Delivered, presentation Book Value

Interest Applicable

On Bonds Maturing

Balance due as Statement Date, 1921

instead of 2.424%, a difference of .73%. As a result of this discrepancy, we understand the Commission has now considered it advisable to make a further reduction in the annual renewal rate of 2.5% which was used as mentioned above. P.W. p.11 & 12.

In respect of the adequacy of the renewal reserve, our Consulting Engineer states as follows:-

"It is understood that it is the practice of the Hydro-Electric Power Commission to spend sufficient money on maintenance account each year so as to keep each and every portion of the system in a condition to operate in accordance with the requirements of economical production which it is stated is considered to be about 75 per cent. as good as its original new condition. This being so, it was considered in this report that the renewal account should be studied in connection with and applied to the renewal of only 25 per cent. of the capital concerned." WJE. p.41

"At the present time the total depreciable capital is probably about $151,000, while the reserve for renewals to the end of 1921 was about $25,471, and should be about $31,500 at the end of 1922, assuming that the 2.5 per cent. rate was applied. As a large portion of the total depreciable capital has been invested within the past few years, and as the useful life of each portion of the equipment is really in the early stages, it would therefore appear that the present total accumulations of the fund as applicable to 25 per cent. of the total depreciable capital is somewhat larger than is necessary, taking all the above factors into consideration." WJE. p.42.

Reserve for Sinking Fund

The balance in the reserve for sinking fund at October 31st, 1921, amounted to $750.60 which represented the charge made against the town of Gravenhurst for the fiscal year ending October 31st, 1921. The reserve for sinking P.W. p.12

instead of 2.44%, a difference of .76%. As a result of this discrepancy, we understand the Commission has now considered it advisable to make a further reduction in the annual renewal rate of 2.0% which was used as mentioned on p. 11 above. R.U. p.11

In respect of the adequacy of the renewal reserve, our Consulting Engineer states as follows:-

"It is understood that it is the practice of the Hydro-Electric Power Commission to spend sufficient money on maintenance account each year so as to keep each and every portion of the system in a condition to operate in accordance with the requirements of economical production which it is stated is considered to be about 70 per cent. as good as its original new condition. This being so, it was developed in this report that the renewal account should be studied in connection with and applied to the renewal of only 30 per cent. of the capital concerned." R.E. p.61

"At the present time the total depreciable capital is probably about $181,000, while the reserve for renewals to the end of 1921 was about $21,471, and should be about $25,000 at the end of 1922, assuming that the 2.0 per cent. rate was applied. As a large portion of the total depreciable capital has been invested within the past few years, and as the useful life of each portion of the equipment is really in the early stages, it would therefore appear that the present total accumulations of the fund as applicable to 30 per cent. of the total depreciable capital is somewhat larger than is necessary, taking all the above factors into consideration." R.E. p.62

<u>Reserve for Sinking Fund</u>

The balance in the reserve for sinking fund at October 31st, 1921, amounted to $786.86 which represented the charge made against the town of Gravenhurst for the fiscal year ending October 31st, 1921. The reserve for sinking P.U. p.13

fund of the Muskoka System is provided on the basis outlined under the Power Commission Act, viz: an amount sufficient to accumulate in thirty years a sum which will repay the investment in the system with a five-year deferment period. As is permitted under the Power Commission Act, the collection of sinking fund for the two municipalities in this system was deferred. During the fiscal year ending October 31st, 1921, the municipality of Gravenhurst has been operating for six years. Therefore, there was included in the cost of power for the year ending October 31st, 1921, an amount of $750.60 for sinking fund based on the rate of 1.6% of the capital employed, applicable to that municipality. As Huntsville has not been operating for six years no provision for sinking fund has been made. P.R. p.12.

Reserve for Contingencies

The balance in the reserve for contingencies at October 31st, 1921, amounted to $1,911.14. P.R. p.13.

The reserve for contingencies was established by the Commission for the purpose of providing for special losses or expenses nor arising at regular intervals and not wholly applicable to the period in which incurred. The contingency reserve for this system is provided through a charge of 25¢ per horse-power included in the costs of power supplied each year to the municipalities and others, together with the interest at 4 per cent. per annum on the balance in the reserve account at the beginning of the year.

Fund of the Eastern System is provided on the basis out-lined under the Power Commission Act, viz: an amount sufficient to accumulate in thirty years a sum which will repay the investment in the system with a five-year deferment period. As is permitted under the Power Commission Act, the collection of sinking fund for the two municipalities in this system was deferred. During the fiscal year ending October 31st, 1931, the municipality of Gravenhurst has been operating for six years. Therefore, there was included in the cost of power for the year ending October 31st, 1931, an amount of $702.64 for sinking fund based on the rate of 1.4% of the capital employed, applicable to that municipality. As Huntsville has not been operating for six years no provision for sinking fund has been made. Vol. p.11.

Reserve for Contingencies

The balance in the reserve for contingencies at October 31st, 1931, amounted to $1,711.15. P.L. p.13.

The reserve for contingencies was established by the Commission for the purpose of providing for special losses or expenses not arising at regular intervals and not wholly applicable to the period in which incurred. The contingency reserve for this system is provided through a charge of 50¢ per horse-power included in the costs of power supplied each year to the municipalities and others, together with the interest at 4 per cent. per annum on the balance in the reserve account at the beginning of the year.

In respect of the adequacy of this reserve, our Consulting Engineer states as follows:

> "Considering the heavy losses which might be occasioned through catastrophe or other contingencies, it is considered that the total amount at the credit of this fund, namely $1,911, should be augmented by increasing the annual allowance for contingencies, and when a reserve of say $5,000 or $10,000 will have been built up, the rates can be readjusted to suit the conditions found after several further years of experience." WJP. p.44.

Accounts with Municipalities.

Accounts with municipalities are divided by the Commission in the main as follows:-

(a) Power Accounts Receivable

(b) Due to or by Municipalities in respect of the cost of power furnished them as determined under the Power Commission Act.

(a) Power Accounts Receivable

The balance of power accounts receivable at October 31st, 1921, amounted to $10,735.51. As at September 20th, 1922, the date on which these accounts were examined by our Auditor, they had all been paid.

(b) Due to or by Municipalities

At the close of each fiscal year, the interim power bills rendered monthly are adjusted to meet the operating cost of the system, as provided by the Power Commission Act.

It does not appear to be the practice of the municipalities to pay in cash these additional charges,

In respect of the adequacy of this reserve, our Consulting Engineer states as follows:

> "Considering the many losses which might be occasioned through catastrophe or other contingencies, it is considered that the total amount at the credit of this fund, namely [illegible], should be augmented by increasing the annual allowance for contingencies, and when a reserve of say [illegible] or [illegible] will have been built up, the scale can be re-adjusted to suit the conditions found after several further years of experience."

[illegible]

[illegible]

Accounts with Municipalities.

Accounts with municipalities are divided by the Commission in its code as follows:-

(a) Power accounts receivable

(b) Due to or by municipalities in respect of the cost of power furnished than as determined under the Power Commission Act.

(a) Power Accounts Receivable

The balance of power accounts receivable at October 31st, 1932, amounted to [illegible]. As at September 30th, 1933, the date on which these accounts were examined by our auditor, they had all been paid.

(b) Due to or by municipalities

At the close of each fiscal year, the interim power bills rendered monthly are adjusted to meet the operating cost of the system, as provided by the Power Commission Act.

It does not appear to be the practice of the municipalities to pay in cash these additional charges,

but instead the Commission increases the interim rates in subsequent periods and thereby reduces the accumulated deficits of prior periods.

Section 23a of the Power Commission Act provides that:

> "The Commission may from time to time during the first three years after any municipality shall first begin to take power from the Commission extend the time for payment of the sums payable by any municipality."

The following balance with the municipality of Gravenhurst extends back to the first year of operation, and beyond the three year limit as authorized by the Act, and it was, therefore, in default in the payment of its power bill. The amounts owing to or by the Commission at October 31st, 1921, are as follows:-

Due by Gravenhurst	$6,272.07
Due to Huntsville	1,290.35

Results of Operation

Power is supplied to the municipalities on the Muskoka System on a cost basis as outlined in the Power Commission Act. The cost of such power includes:

1. Operating and maintenance expenses.
2. Interest on the monies invested in the works of the system.
3. Provision for the renewal of the works.

has lessened the cumulative increases the levels which in subsequent periods and thereby reduces the accumulated deficits of prior periods.

Section 12A of the Power Commission Act provided that:

> "The Commission may from time to time during the first three years after any municipality shall first begin to take power from the Commission extend the time for payment of the sums payable by any municipality."

The following balances with the municipality of Gravenhurst extends back to the first year of operation, and beyond the three year limit as authorized by the Act, and it may, therefore, be in default in the payment of its power bill. The amounts owing to or by the Commission at October 31st, 1931, are as follows:-

Due by Gravenhurst	$4,574.77
Due to Huntsville	1,333.38

__Municipal Financing__

Power is supplied to the municipalities on the Muskoka System on a cost basis as outlined in the Power Commission Act. The cost of such power includes:

1. Operating and maintenance expenses.
2. Interest on the capital invested in the works of the system.
3. Provision for the renewal of the works.

4. Sinking fund on a thirty-year basis to repay the investment in the system.

The operating account of the system for the four years ending October 31st, 1921, is as follows: P.W. Ex.I

Particulars	Fiscal year ending October 31st, 1918	1919	1920	1921
Revenue				
From municipalities	$21,758.80	$25,035.83	$25,063.44	$27,121.94
From sundry customers	56.55	56.05	51.19	51.00
Total	$21,815.35	$25,091.88	$25,114.63	$27,172.94
Operating Expenses & Fixed Charges				
Operating Expenses	$4,512.35	$5,104.71	$5,373.83	$5,521.75
Maintenance Expenses	2,160.00	3,061.28	1,696.02	2,752.05
Overhead Expenses	2,169.89	2,711.79	2,705.47	2,832.36
Interest	7,930.95	8,802.57	9,661.89	9,670.16
Provision for Renewals	4,956.73	5,078.29	5,308.63	5,315.27
Provision for Sinking Fund	-	-	-	750.60
Provision for Contingencies	247.23	296.47	337.50	301.80
Total	$21,777.15	$25,055.11	$25,083.56	$27,141.97
Balance transferred to contingencies representing profit on power sold to sundry customers	$38.20	$36.77	$31.27	$30.97
Total Horse-Power billed	979.9	1185.9	1350.0	1207.2
Cost per horse-power billed	$22.22	$21.13	$18.58	$22.48

The following table, giving the detailed cost per horse-power billed, shows in what respects and to what extents the costs have varied:

WJF. p.50

Particulars	Fiscal year ending October 31st, 1918	1919	1920	1921
Operating	$4.40	$4.30	$3.98	$4.58
Maintenance	2.20	2.58	1.26	2.28
Overhead & General Expenses	2.21	2.29	2.00	2.35
Interest	8.09	7.42	7.16	8.02
Renewals	5.07	4.29	3.93	4.38
Sinking Fund	-	-	-	.62
Contingencies	.25	.25	.25	.25
	$22.22	$21.13	$18.58	$22.48

Under the date of July 27th, 1915, the Commission submitted an estimate to the municipality of Gravenhurst to supply 300 horse-power at $15.51 per horse-power.

The actual loads taken by Gravenhurst and the actual cost per horse-power for the years 1918 to 1921 inclusive are as follows:

P.W. Ex.L

	Actual Load	Actual Cost per h.p.
Year ending October 31, 1918	312.6	$17.18
Year ending October 31, 1919	359.3	17.09
Year ending October 31, 1920	478.4	14.43
Year ending October 31, 1921	368.2	19.10

Average Load - 379.6
Average Cost - $16.76

From the above it will be noted that the actual load exceeded the estimated load by 79.6 horse-power or 26.5% and at the same time the actual cost exceeded the estimated cost by 8%.

The Editorial Board's Client and Security Data

Has Baran-Dunn Filing Status at Last Update Now Be Open?

Estimate the Audit Date Variance:

Shareholders	1940	1944	1950	1954
Chartered	54.4%	46.3%	31.2%	24.7%
Institutions	8.2%	11.0%	14.8%	19.3%
Employee & Insured Syndicate	9.4%	12.1%	15.6%	18.2%
Individuals	8.8%	10.4%	7.9%	8.4%
Treasury	8.4%	6.2%	8.3%	7.1%
Floating Fund	-	-	-	1.8%
Institutions	10.3%	13.0%	14.2%	20.5%
	100.0%	97.1%	100.0%	100.0%

COPY

Under the Patent Trade Act of July 1910, the Commissioner

authorized to examine an application if Jurisdiction or

exhibit 201 Baran-Dunn is $19.81 Baran-Dunn.

The United Trade Union of Draughtsmen and Allied Trades

over Bar Partnership for the Period 1910 to 1911 Inclusive are

as follows:

	Income	Value
Trade Mutual Insurance Co., 1911	$18.4	$14.18
Trade Mutual Insurance Co., 1912	209.1	17.80
Trade Mutual Insurance Co., 1913	228.4	26.42
Trade Mutual Insurance Co., 1914	244.5	19.20

Taxable Bond - $19.49

Taxable Bond - $14.8

Each type shown is still in order Edit the Patent

Year ended the net-owned Year is 12.2 Baran-Dunn or 12.3%

and at the same time the patent was assigned the existing

Year 5. 84.

The Commission submitted the following estimates to the municipality of Huntsville in respect of supplying power to it. Other estimates were submitted covering a supply of power from the High Falls plant, but inasmuch as the power has been supplied from the South Falls plant, they have been omitted from this report. The estimates are as follows:

	On basis of contract for 15 yrs.	20 yrs.	
For 700 horse-power	$29.55	$26.62	P.W. Rx.I.
For 800 horse-power	25.92	25.02	

The contract finally made by the Commission and Huntsville covered a period of sixteen years.

The actual loads taken by Huntsville and the cost thereof per horse-power for the years 1918 to 1921 are as follows:

	Actual Load	Actual Cost per H.P.
Year ending October 31, 1918	667.5	$24.32
Year ending October 31, 1919	826.6	22.85
Year ending October 31, 1920	871.6	20.84
Year ending October 31, 1921	839.0	23.94

Average Load - 801.1
Average Cost - $22.89

From the above it will be noted that the actual average load has slightly exceeded the estimated load of 800 horse-power, while the cost is considerably less than the estimated cost for a corresponding amount of horse-power.

POWER DATA

Population Served

The district served by the Muskoka System is urban only, there being no rural lines built to October 31st, 1922. The whole of the load is carried by the municipalities of Gravenhurst and Huntsville, which in turn sell large blocks of power under contract to the National Potash Corporation in Gravenhurst and the Anglo-Canadian Leather Company in Huntsville. During the summer season some electricity is sold to sundry customers at Muskoka Falls.

"Municipal Statistics" of the Province of Ontario for 1921 gives a total population of about 21,000, all-year residents, for those portions of the Counties of Muskoka, Parry Sound and Haliburton, which might be tributary to the Muskoka System. At October 31st, 1921, the total population in the two municipalities served by the system was about 3,600 persons, with about 814 consumers. As Bracebridge with about 2,400 population is the only other town of any size tributary to the Muskoka System and is already supplied with electricity by its own plants, the greater part of the remaining 15,000 population could only be supplied by a fairly extensive system of rural lines. The two municipalities now served were billed with about 1,207 horse-power in the fiscal year 1921, and about 1,344 horse-power in 1922, thus showing an increase of about 137 horse-power in the demands

POWER DATA

[illegible]

Population Served

The district served by the Muskoka System is urban only, there being no rural lines built to October 31st, 1932. The whole of the load is supplied by the municipalities of Gravenhurst and Huntsville, which in turn sell large blocks of power under contract to the National Sanitarium Association in Gravenhurst and the Anglo-Canadian Leather Company in Huntsville. During the summer season some electricity is sold to sundry customers at Muskoka Falls.

"Municipal Statistics" of the Province of Ontario for 1931 gives a total population of about 21,000, all-year residents, for those portions of the Counties of Muskoka, Parry Sound and Haliburton, which might be tributary to the Muskoka System. On October 31st, 1931, the total population in the two municipalities served by the system was about 5,880 persons, with about 810 consumers. As Bracebridge with about 3,000 population is the only other town of any size tributary to the Muskoka System and is already supplied with electricity by its own plants, the greater part of the remaining 12,000 population could only be supplied by a fairly extensive system of rural lines. The two municipalities now served were billed with about 1,607 horse-power in the fiscal year 1931, and about 1,744 horse-power in 1932, thus showing an increase of about 137 horse-power in the demands

of Gravenhurst and Huntsville. The indications are that the municipality of Bracebridge will require a fairly large amount in the near future to meet the industrial growth and municipal requirements, their present demand having already outgrown the capacity of their hydro-electric plants.

The following table gives in detail the number of consumers at the end of the fiscal year 1921, in the places served by the Commission, the approximate horse-power billed to each place in 1921, the total kilowatt-hours consumed on the system in 1921, together with the average horse-power and average kilowatt-hour per consumer. The figures are useful for comparison with other systems although they should be used with caution.

WJF.
p.19

Municipality	Population	Consumers	Percentage Consumers to Population	H.P. Billed 1921	Kilowatt-Hours 1921	Billed H.P. per consumer	Kilowatt Hours per Consumer
Gravenhurst	1,452	381	26.6	368.2	-	0.97	-
Huntsville	2,176	434	19.9	839.0	-	1.93	-
Totals	3,608	815	22.6	1,207.2	4,605,325	1.48	5,650

The average horse-power billed per consumer and per capita, and the average kilowatt-hours per consumer and per capita for the fiscal year 1921 are as follows:

Average Horse-Power billed per consumer	1.48
Average Horse-power billed per capita	0.33
Average Kilowatt-hours billed per consumer	5,650
Average Kilowatt-hours billed per capita	1,276

Municipality	Index numbers in Paper-boxes filled during 1911 (1913 = 100)			Average number of Kilowatt-hours per customer during 1911		Kilowatt-hours per dollar of Revenue
	Paper-boxes	Tenure-houses	Gas-engines	Residence	Office-building	Motors
Evansburgh	1,022	191	16.6	289.3	-	6.84
Zanesville	1,116	634	19.7	302.7	-	1.81
Vestale	3,608	838	24.4	1,204.7	6,849.2	1.64

The average Horse-power filled per customer and per capita, and the average Kilowatt-hours per customer and per capita for the three years 1913 are as follows:

Average Kilowatt-hours billed per capita	7.42
Average Horse-power filled per customer	3.81
Average Horse-power filled per capita	1.49

Growth of Market and Ultimate Sources of Power Supply

Since the commencement of operations of the Muskoka System in November 1915, the growth has been steady except for a decrease of about 150 horse-power during 1921 due to an industrial slump at Huntsville. The table given below shows the loads for the system, the figures being given in horse-power:

WJF. p.20.

	Fiscal Years Ending October 31st						
	1916	1917	1918	1919	1920	1921	1922
Gravenhurst	235x	321.7x	312.6	359.3	478.4	368.2	362.7
Huntsville	580x	527.8x	667.3	826.6	871.6	839.0	981.
Totals	815	849.5	979.9	1,185.9	1,350.0	1,207.2	1,343.7

x - Power taken during October

It will be seen from the table above that the load for Huntsville during 1922 has increased by about 140 horse-power over that of 1921, thus showing that industrial conditions are approaching normal and that the system has regained its usual growth. These figures do not show the actual peaks on the system, but they do indicate the growth of the demand.

The problem of serving rural customers is difficult, the average number of consumers per mile being small, and the experience of the Commission is that only three or four per mile are obtainable.

The situation at the present time is that there is a shortage of power at South Falls and at the Bracebridge plants.

Indications are that the municipality of Bracebridge will soon become a partner in the Muskoka System, and will either operate their plants in parallel with the South Falls generating station or will receive an additional supply of power from the transmission system.

It is estimated by the engineers of the Commission that the 4,000 horse-power still said to be available at the South Falls plant when the necessary generating equipment will have been installed, will be taken up by 1928. It will then be necessary to look to the High Falls site on the North Branch of the Muskoka River or to the other sites mentioned above, or to some source outside of the district of the Muskoka System. Except for the South Falls site, most of the individual sites in the district are comparatively small, but the aggregate capacity might be from 12,000 to 15,000 horse-power exclusive of South Falls, provided that all the sites prove to be commercially feasible for development. The value of the sites on the lower Muskoka River and on the Moon River would depend in large measure on the degree of practicable regulation of Lake Muskoka, which is doubtful.

This brings up the question of the ultimate use of power in the district and the future source of power supply. If Niagara power be used it would necessitate the building northwards of a number of tie lines extended from the Niagara System to the Wasdell's and Severn Systems and from there to the Muskoka System, and adapted for the Muskoka System by means

of frequency-changers, since Niagara power is developed at 25 cycles and the other systems use 60 cycles.

To use power from the French River for the Muskoka System and for the Combined Northern Systems, and possibly for the Nipissing Section and for the northerly portion of the Trent Section of the Central Ontario System, long transmission lines from the French River to Nipissing, and from Nipissing to Muskoka, and from Muskoka to Wasdell's and to the Trent Systems would be required. As all of these systems are operated at 60 cycles, the use of French River power, which is contemplated at 60 cycles, would avoid the use of frequency-changing apparatus. The development of the French River sites would depend on the growth of the load on the Combined Northern Systems, and in the North Bay-to-Sudbury district, to a sufficient degree to permit of their economical use. If the general power demand continues to increase at a rapid rate, the total economical capacity of the French River sites, which is probably about 20,000 horse-power, might be reached within a comparatively few years, in which case Niagara power would be the only feasible source of supply. From an operating point of view it would be preferable to use power generated at 60 cycles and avoid the complication of frequency-changers. It is understood that the Commission contemplates the use of some Niagara power through frequency-changers in the near future, for the Eugenia System.

of frequency-changers, since Niagara power is developed at 25 cycles and the other systems use 60 cycles.

To use power from the French River for the Muskoka System and for the Georgian Northern System, and possibly for the Nipissing Section and for the northerly portion of the Trent section of the Central Ontario System, long transmission lines from the French River to Nipissing, and from Nipissing to Muskoka, and from Muskoka to [illegible] and up the Trent System would be required. As all of these systems are operated at 60 cycles, the use of French River power, which is contemplated at 25 cycles, would entail the use of frequency-changing apparatus. The development of the French River sites would depend on the growth of the load on the Georgian Northern System, and in the North Bay-to-Muskoka districts, to a sufficient degree to permit of their economical use. If the general power demand continues to increase at a rapid rate, the total economical capacity of the French River sites, which is probably about 25,000 horse-power, might be reached within a comparatively few years, in which case Niagara power would be the only possible source of supply. From an operating point of view it would be preferable to use power generated at 60 cycles and avoid the complication of frequency-changers. It is understood that the Commission contemplates the use of some Niagara power through frequency-changers in the near future, for the Georgian System.

If power be transmitted from either of these sources, a system of billing for each of the four or five systems affected would have to be developed so as to fairly apportion the costs of the transmitted power. WJF. p.19, 20,21, & 22.

Horse-power Developed, Etc.

On page 26 of our Consulting Engineer's report is shown a table of horse-power developed, consumed, billed, etc., for the years 1916 to 1922 inclusive.

Power Situation

The market for power has been well covered in the two municipalities served in the district. The density indicates a high percentage of consumers per capita of population. The demand for electricity is apparently still growing and indications are that further sources of power supply must be provided in the immediate future. The ultimate demand for power and the ultimate sources of supply should be considered in the near future. WJF. p.53

GENERAL RELATIONS

Relations between the Gravenhurst Electric Light and Water Commission and the Hydro-Electric Power Commission

On February 21st, 1919, Mr. Butterworth of the Gravenhurst Commission wrote the Hydro-Electric Power Commission in part as follows:-

> "When we entered into the contract with the H.E.P.C., it was with the understanding that the rate was to be $10.00 per horse-power per year, but before submitting the by-law, acting on the recommendation of Sir Adam Beck, that clause was changed and we accepted the standard contract, because Sir Adam held out the expectation that the rate would be lower.
>
>
>
> However at the end of the first year the rate was increased to $12.56, the reason assigned being that we had not taken the amount of power agreed viz: 500 horse-power. Our average for the last year is well over 500 horse-power, and our Commission feel that they are now entitled to the $10.00 rate, although we notice that the power bill just paid is still being billed at the $12.56 rate. Will you please take this matter up and advise us why we are not receiving the power at the lower figure."

The Chief Engineer of the Commission replied a few days later pointing out that power is delivered to all municipalities at cost and that a report on cost of operation of the Muskoka System would be submitted.

The matter of the cost of power appears to have been a subject for dispute between the Gravenhurst Commission and the Hydro-Electric Power Commission. At the hearing on "General Relations" on April 25th, 1923, Mr. Butterworth in

CHAPTER SIXTEEN

Relations between the Bureaucracy and the Electro-Literate Power Complex

Concerning Matters Pertaining to Bureaucratic Control

Over the Electro-Literate Power Complex

Statement Made Upon Oath

Relations between the Bureaucracy

and the Electro-Literate Power Complex

"General Relations" on April 21st, 1919, Dr. Hollenbeck is reported as having said that the Electro-Literate Power Complex "is a unique and highly specialized organism, and the Bureaucracy cannot be expected to have a knowledge of its operation as deep as that possessed by its own members."

The entire Bureaucracy of the Administration replied to the above letter pointing out that power is derived by all municipalities at rates much lower than those charged by the Electro-Literate Power Complex. The Bureaucracy further pointed out that the Electro-Literate Power Complex was not even a municipality, and that it was not entitled to the privileges of municipalities.

The Electro-Literate Power Complex replied that it was not a municipality, but that it was a municipal necessity, and that it was entitled to the privileges of municipalities. It was pointed out that the Electro-Literate Power Complex had been established by the Bureaucracy, and that it was the duty of the Bureaucracy to see that the Electro-Literate Power Complex was properly managed. The Bureaucracy replied that it was not its duty to see that the Electro-Literate Power Complex was properly managed, but that it was the duty of the Electro-Literate Power Complex to see that it was properly managed. The Electro-Literate Power Complex replied that it was not its duty to see that it was properly managed, but that it was the duty of the Bureaucracy to see that it was properly managed.

evidence made the following statements:

"The original proposal was power at $10.00 per horseppower, and we were told that if Hydro took it over we should probably get it at $8.00, certainly less than $10.00, but we are now paying $20.00." Ev. 5005

"We find quite a difficulty in getting men who are willing to sit on the Commission; they take the view that the Hydro control it to such an extent that they might as well stay at home and let Hydro control the whole thing. We have no power to fix the rate that shall be charged and we have no voice in determining what expenditure shall be incurred and we have simply to take our instructions from the Hydro Commission." Ev. 5005

"Then we have Bracebridge, they can generate power and sell it to their manufacturers at $12.66 a horse-power. I was talking to their Mayor a few weeks ago. They are not on the Hydro and they tell you you could not chase them on the Hydro, although they would like to have more power. They are operating their plant at $12.66 a horse-power. The Mayor was for a long time on the Commission and he claims they are absolutely sound." Ev. 5007

Mr. Lucas and Mr. Jeffrey, who were present representing the Commission at the hearing at which this evidence was given, questioned the witness on other matters, but did not contradict the statements quoted.

The above extracts from correspondence and evidence do not agree with the information submitted by our Accountants who show in their report that the estimate submitted by the Commission to the town of Gravenhurst on July 27th, 1915, was in the amount of $15.51 based on a load of 300 horse-power.

evidence made the following statements:

"The original proposal was power at $15.00 per horse-power, and we were told that if Hydro took it over we should probably get it at $9.00, certainly less than $10.00, but we are now paying $20.00." Ev. 3008

"We find quite a difficulty in getting men who are willing to sit on the Commission; they take the view that the Hydro control it to such an extent that they might as well stay at home and let Hydro control the whole thing. We have no power to fix the rate that shall be charged and we have no voice in determining what expenditure shall be incurred and we have simply to take our instructions from the Hydro Commission." Ev. 3009

"Then we have Bracebridge, they own generate power and sell it to their consumers at $11.50 a horse-power. I was talking to their Mayor a few weeks ago. They are not in the Hydro and they tell you you could not chase them on the Hydro, although they would like to have more power. They are operating their plant at $11.50 a horse-power. The Mayor was for a long time on the Commission and he claims they are absolutely sound." Ev. 4257

Mr. Evans and Mr. Jeffrey, who were present representing the Commission at the hearing at which this evidence was given, questioned the witness on other matters, but did not contradict the statements quoted.

The above extracts from correspondence and evidence do not agree with the information submitted by your Accountants who show in their report that the estimate submitted by the Commission to the Town of Gravenhurst on July 17th, 1915, was in the amount of $18.21 based on a load of 250 horse-power.

As no public hearing has been held in connection with the system it is not possible to explain the differences between the evidence and our Accountants' findings.

Letter from Mr. Ditchburn of the Ditchburn Pleasure Boats, Limited, to Mr. McCollum of the Hydro-Electric Power Commission

In the files of the Commission, the following letter appears under date of December 31st, 1920:

"Please accept thanks for charts you sent regarding the lead carried at the pumping station. Mr. Butterworth advises me that he has returned these to you several days ago and trust they reached you.

I am not on the Commission any longer so will not have the pleasure of doing business with you any further in connection with Hydro power. I am still, however, very much interested in the welfare of our town, as every good citizen should be, and I implore your best efforts to keep us in as favourable a condition with respect to electrical energy as you can. Reviewing the whole situation, it seems very unfortunate that we should ever have gotten into this Hydro business, if there was any way to avoid it, and I certainly think that, with all due respect to the Hydro Commission, there is a tremendous lot of room for improvement in both the Act and the carrying out of same, and particularly with respect to the engineering Department. As the writer recently saw stated in the Mail and Empire, it is an Act in the first place, which isn't founded on the principles of Democracy and British Justice, and this alone will eventually, as soon as the people realize it, make it unpopular, and either cause its downfall or a sweeping revision of the Act. It is nothing more than an autocratic institution licensed by a Democratic Government, as no doubt you can see for yourself, whoever heard in the ordinary course of business of a contract being entered into between two parties, in which one of the parties was given

the right to settle all disputes. This to my mind is in itself ridiculous and obviates the necessity for any contract at all.

All said and done: the following glaring facts remain, namely, that the town of Gravenhurst at one time owned and operated an electric generating station which was very economically installed and operated, so much so that besides being able to offer special inducements for manufacturers to come here, we were still able to produce a revenue that helped to reduce our tax rate and altogether we seemed to be in a very advantageous position. Then along came the officers of the Hydro Electric and statements were made to the effect that our condition would be very much improved by going in with the Hydro and quite naturally we believed these statements, with the result that now we find ourselves paying higher than ever for power, with no special inducement to offer, and with an accumulating debt, over which we have no control, without saying anything on the fact that the Hydro did not allow us what it cost to build the plant in the first place. As part of this original cost was the good will of a private concern that we had to purchase before we could start. This was thought an injustice at the time, but in the expectations of getting, as promised, a cheaper power, it was let slide.

We are situated between two non-Hydro towns, namely Bracebridge and Orillia, both of which have power to offer at less than we can ever hope to and yet the Commission, although they have the power to set the rate in these towns, allow us to remain at this tremendous disadvantage.

We really believe that a nicely written review of the whole transaction between the Hydro and the town backed up with correspondence and unsigned contract, etc., that we have on file would prove so conclusively as to misstatements and inefficiency and miscalculations of the Hydro management as to interfere very severely in inducing other municipalities to take on Hydro, and for this reason alone, your Commission might do something for us to right the injustice and improve the feeling that exists in general in this section of the country with respect to Hydro development."

necessary for any connection at all.

...

Contract between the Commission and the Town of Huntsville

The contract between the Commission and the municipality of Huntsville provides, among other things, that the municipality shall pay as a part of the cost of power "an annual sinking fund instalment of such amount as to form at the end of 16 years, with accrued interest, a sinking fund sufficient to repay the Corporation's proportionate part, ... of all moneys advanced by the Province of Ontario for the acquiring of the properties and rights, and acquiring and construction of generating plants, transformer stations, transmission lines, distributing stations and other works necessary for the delivery of electrical energy or power, delivered to the Corporation under the terms of this contract".

From the examination of the Commission's books it is to be noted that the sinking fund standing deferred against the municipality of Huntsville as at October 31st, 1921, has been provided on a thirty-year basis instead of a sixteen-year basis as required under the provisions of the contract.

S U M M A R Y

In the foregoing sections of this report comment has been introduced from time to time to make the various statements clear. No public hearing was held in reference to matters connected with this system, in consequence of which the report is based entirely upon facts and figures supplied in the official reports of the Accountants, Messrs. Price, Waterhouse & Company, and the Consulting Engineer, Mr. Walter J. Francis.

In order to direct attention to the matters on which the Commission may desire to give particular attention hereunder is given a brief summary of the points which appear to require special consideration.

Commission purchased Generating Plant ("Historical" - p.3)

In October 1915 the Commission purchased a development plant at South Falls on the South Branch of the Muskoka River from the municipality of Gravenhurst. The Engineers of the Commission valued the plant at $39,386 with a replacement value of $52,158, and suggested that the price paid be $43,388.61. The price actually paid by the Commission was $50,596, which amount was distributed in the books of the Commission as a tangible value of $33,230 and an intangible value of $17,366.

S U M M A R Y

In the foregoing sections of this report mention has been incidentally made from time to time of the various [illegible] of public interest [illegible] in connection with this inquiry, in [illegible] of which the report is based entirely upon facts and figures supplied in the official reports of the Accountants, Messrs. Price, Waterhouse & Company, and the Consulting Engineer, Mr. Walter J. Francis.

In [illegible] attention to the matters on which the Commission may desire to give particular attention hereunder is given a brief summary of the points which appear to require special consideration.

Dominion purchased Generating Plant ("Electrical" - p.2)

In October 1910 the Dominion purchased a generating plant at [illegible] Falls on the North Branch of the [illegible] River from the municipality of [illegible]. The Engineers of the Commission valued the plant at $[illegible] with a replacement value of $[illegible], and suggested that the price paid be $[illegible]. The price actually paid by the Commission was $[illegible], which amount was distributed in the books of the Commission as a tangible value of $[illegible] and an intangible value of $17,368.

Capital Investment ("General Economics" - p.16)

Since the purchase of the plant by the Commission, they have expended on power development, wood pole lines and distributing stations the sum of $161,935.03. The total investment as at October 31st, 1921, was $212,530.96 of which amount $17,400 is carried on the books of the Commission, representing the value of intangibles taken over with the South Falls plant.

Capital Cost per Horse-Power ("General Economics" - p.17)

The Commission have succeeded in reducing the capital cost per rated horse-power since the purchase of the plant. In 1916 the cost of power development was $164.10 per horse-power and in 1921 this had been reduced to $116 per horse-power. The total cost per rated horse-power including power development, transmission lines, transforming and distributing stations has been reduced from $292.20 per horse-power in 1916 to $166.14 in 1921.

Reserve for Renewals ("General Economics" - p.18)

Our Consulting Engineer reports that the renewal reserve is somewhat larger than is necessary, taking all factors into consideration.

Reserve for Sinking Fund ("General Economics" - p.21)

Reserve for sinking fund has been provided for in the cost of power in accordance with the Power Commission Act

to form in thirty years with interest at 4% the amount of capital invested.

Reserve for Contingencies ("General Economics" - p.21)

The amount to the credit of this account as at October 31st, 1921, was $1,911.14. Our Consulting Engineer considers this amount inadequate and states that it should be augmented by increasing the annual allowance for contingencies until an amount of $5,000 or $10,000 has been built up, the rates to be then adjusted to suit conditions found after several further years of experience.

Accounts with Municipalities ("General Economics" - p.22)

The balance in the power accounts receivable at October 31st, 1921, amounted to $10,735.31. These accounts were examined as at September 20th, 1922, and it was found that they had all been paid by that time. As at October 31st, 1921, there was a debit balance against the system of $4,981.72 made up of a debit balance against Gravenhurst of $6,272.07 and a credit balance to Huntsville of $1,290.35. The debit balance against Gravenhurst extended back to the first year of operation and beyond the three-year limit as authorized by the Act, and this municipality was therefore in default in the payment of its power bill.

employ inasmuch.

Answer the Questionnaire (Answers required.) - Page 1.

The answer to the second is this because we do

[illegible] 1923, was $1,321.75. One Government Bulletin

[illegible] it [illegible] the number [illegible]

[illegible] only an amount of $[illegible] is [illegible] but item

[illegible] 25, the total is $[illegible] [illegible]

[illegible] already [illegible] [illegible].

[illegible] Answer with [illegible] Answers required. - Page 1.

The balance in the Bank [illegible] is

[illegible] 1923, amounted to $[illegible]. Three [illegible]

[illegible] [illegible] [illegible] 1923, [illegible] [illegible] [illegible]

[illegible] [illegible] [illegible]

Estimated Power Loads as Compared with Actual Power Loads and Estimated Costs compared with Actual Costs. ("General Economics" p.25)

Comparing the estimates submitted by the Commission on July 27th, 1915, to the Municipality of Gravenhurst, it is found that the actual load exceeded the estimated load by 26.5%. Even with the actual load exceeding the estimated load, the actual cost of power to the municipality exceeded the estimated cost by 8%. (Before giving effect to the reduction in the renewal reserves referred to in the "Addenda")

In the case of the Municipality of Huntsville, an analysis of the estimates shows that the actual average load has slightly exceeded the estimated load and that actual cost is somewhat less than the estimated cost.

Future Sources of Power ("General Economics" - p.31)

While there is a considerable amount of undeveloped power available in the district, careful investigation should be made before money is expended on this development to ascertain the feasibility of introducing Niagara power into this system or the practicability of bringing power from any developments that might be made in the future in the French River District. From an operating point of view it would be preferable to use power generated at 60 cycles, such as would be obtainable from the development of sites within the immediate district or from the French River District, but since it is understood that the Commission contemplates the use of some Niagara power through frequency changers for the Eugenia System, it might be more

Unfortunately absolutely for the Magnetic Electric, it might be more expedient counterphrase the use of some Electron Power Corporation Electric Distrist" and stress it is temperature that the Consumption at site within the immediate District be less the Temperature at 60 degrees" such as would be alternative than the Power Plan an elevated point at time it would be impossible to use Power Plans that might be made in the Summer it the Grand Plan District" Energy Commission Electricity Corporation Electric Power Plans and Electricity Corporation Electric Power Plans and Electricity Corporation Electric Power Plans and

economical to extend the use of this power to the Nasdell's, Severn and Muskoka Systems.

Relations with Municipalities of Gravenhurst and Huntsville ("General Relations" - p. 33)

On behalf of the Municipality of Gravenhurst, Mr. Butterworth of the Gravenhurst Commission complains that they have been misled by the Commission as to the cost of power. Mr. Butterworth voiced these complaints before the Inquiry Commission in the presence of officials of the Commission, and they were not replied to. In reply to a letter from Mr. Butterworth to the Commission on this matter, the Chief Engineer of the Commission pointed out that power has been delivered to the municipality at cost on the basis of the contract in force and made no reference to the statements alleged to have been made by Sir Adam Beck that the rate to Gravenhurst was to be $10.00 per horse-power per year, and that this rate might be reduced.

As pointed out sinking fund is being provided in accordance with the terms of the Power Commission Act. Insofar as the Municipality of Huntsville is concerned, however, the contract in force with the Commission is for a term of only sixteen years. This contract provides that the municipality shall pay as a part of the cost of power "an annual sinking fund instalment of such amount as to form at the end of sixteen years with accrued interest, a sinking fund sufficient to repay the corporation's proportionate part . . . of all moneys advanced by the Province of Ontario . . ." Thus it will be

observed that while the Commission is following the provisions of the Power Commission Act in respect of sinking fund, it is not following the terms of its contract with the Municipality of Huntsville. Unless the Commission is successful in having its contract with Huntsville renewed at the expiration of the sixteen-year period, Huntsville will have contributed only sixteen payments to the sinking fund reserve, and the question arises as to what authority the Commission have for collecting the balance then due on the expiration of the contract.

A D D E N D A

It has recently been brought to our attention that the Commission has made substantial reductions in the renewal rates charged in various systems, and that such reductions have been made retroactive to the date of first operation.

Memorandum re Reduction of Renewal Rates on the Muskoka System

On December 20th, 1922, the Commission passed the following minute reducing the renewal rates on the Muskoka System:

> "The Chief Engineer having recommended a revised depreciation rate calculated on the basis of the life of the equipment, also having advised that this matter had been taken up with Mr. Francis and approved, it was decided that the depreciation rate for the Muskoka System should be fixed at 1.25 per cent., and that this rate be made retroactive to the date of first operation."

The rate used by the Commission was 2.5 per cent. and this revision has resulted in a reduction of the rate of 1.25 per cent.

We have been informed by Mr. McPherson, in charge of Hydro accounts in the absence of Mr. Pierdon, that the effect of this revision has resulted in a reduction of the renewal reserve at October 31st, 1921, of approximately $13,935, with interest accretions of the fiscal year ending

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"The Chief Engineer reconsidered a revised
Estimate showing the renewal based on the Insurance
Companies' Table of Mortality and Investment Yield
of the Province, also having which that
rate should be used in the Br. Columbia
and Ontario Companies at the Dominion Office
Life of the equipment, also having which that
depreciation amounted on the basis of the
rate for the Dominion System should be fixed as
1.2% per cent.", and that this rate be made retro-
active to the date of first operation."

The rate used by the Commissioner was 4% per cent.
and this material has resulted in a reduction of the item of
1.2% per cent.

On June 30th 1914 by Mr. Hopkinson, in charge
of Edge's engineers in the absence of Mr. Kinsey, that the
actual rate varied in a reduction of the
$19,482, with interest equivalent of the first two months
Company rental is December 31st, 1921, at approximately
actual rate varied in a reduction of the
of Edge's engineers in the absence of Mr. Kinsey, that the
1.2% per cent.

On June 30th 1914 by Mr. Hopkinson, in charge
and this material has resulted in a reduction of the item of
The rate used by the Commissioner was 4% per cent.
motive to the date of first operation."
1.2% per cent.", and that this rate be made retro-
rate for the Dominion System should be fixed as
and effected, it was decided that the depreciation
life of the equipment, also having which that
depreciation rated on the basis of the

October 31st, 1922, of which $13,920 has been applied as a credit to the municipalities as a reduction in the cost of power, and $15 as an addition to the contingency reserve. The amount of $13,920 credited to the municipalities has the effect of reducing the cost of power to them during the entire period of operation to October 31st, 1921, and would have the effect of reducing the balances owing by them at October 31st, 1921, or increasing the balances due by the Commission to them.

It is to be noted that this reduction will reduce the actual cost per horse-power below the estimated cost.

The operating figures in the report are also subject to revision, especially the annual cost per horse-power.

In view of the instructions given, no attempt has been made to recast the figures in order that they may conform with the changes made, but it is pointed out that in reporting to the Government some reference should be made to the reduction that has been made in the renewal reserve account.

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